

Patent Application of

James M. Stoddard

For

**TITLE: ILLUMINATED ELECTRICAL PLUG ADAPTER**

**CROSS-REFERENCE TO RELATED INVENTIONS      Not Applicable**

**FEDERALLY SPONSORED RESEARCH      Not Applicable**

**SEQUENCE LISTING OR PROGRAM      Not Applicable**

**BACKGROUND OF THE INVENTION - - FIELD OF INVENTION**

**[0001]** This invention relates to electrical adapters, including 120 VAC plug adapters equipped with light emitting diodes used to illuminate receptacles.

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**BACKGROUND OF THE INVENTION**

**[0002]** Presently existing electrical plugs are very common and vital components providing a convenient and safe way to quickly provide power to electrical devices.

**[0003]** There are situations where plugging a device into a outlet can be somewhat difficult; one such example is attempting to align a plug to an electrical outlet where the outlet is obscured by darkness.

**[0004]** U.S. patent 6,290,533 (2001) to Major discloses a flashlight plug which is an illuminated male electrical plug & cord. It is designed to illuminate an electrical outlet while a user is in the process of attaching the plug to the receptacle. Drawbacks to this device include: disclosed in the form of a plug/cord, it cannot be used on existing devices without replacing the original electrical cord. Considering the vast difference of electrical cord designs, including mounting, strain relief, amperage ratings, and differences of electrical attachment found on electrical appliance power cords, providing this plug/cord with a safe and suitable universal design could become a very daunting and expensive proposal. Incorrect installation of the Flashlight Plug may cause potential for electrical shock and damage to the appliance. If not provided by the manufacturer as original equipment, to mount this plug/cord on an existing appliance may void a warranty (for equipment with a warranty). Even if this plug were designed to replace the plug component of an existing power cord (cutting off the plug and attaching the Flashlight Plug to the end of the power cable), the same hazards and shortcomings as mentioned above may still apply. For appliances using a wall mount transformer, this plug/cord, or plug only, is of no practical use.

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While this plug may be a useful device for a manufacturer to install as original equipment on electrical appliances, it has very limited use as a replacement cord or plug on the vast majority of existing appliances. Additionally, once the Flashlight Plug is installed onto an appliance, it becomes a semi-permanent component of that appliance and cannot easily be unattached for use on other electrical devices.

**[0005]** It becomes apparent that an illuminated adapter for receptacle illumination, designed for temporary attachment to existing power cords can be useful and provide substantial improvement over an illuminated power cord or plug. No illuminated adapter designed for receptacle illumination could be found in the prior art.

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**BACKGROUND OF THE INVENTION - - OBJECTS AND ADVANTAGES**

**[0006]** Several objects and advantages of the present invention are:

**[0007]** (a) to provide the Illuminated electrical plug adapter using a light emitting diode as the light source;

**[0008]** (b) to provide the Illuminated electrical plug adapter using a small battery and switch to provide and control power to the light emitting diode;

**[0009]** (c) to provide the Illuminated electrical plug adapter using an electrical circuit for recharging the battery;

**[0010]** (d) to design the Illuminated Electrical adaptor to fit on several types of existing power cord/plug assemblies.

**[0011]** (e) to design the Illuminated Electrical adaptor for attachment to a wall mount transformer.

**[0012]** Still further objects and advantages will become apparent from a consideration of the ensuing description and drawings.

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**SUMMARY**

**[0013]** In accordance with the present invention, my Illuminated Electrical Plug Adapter comprises a body, a light emitting diode, a power source, a switch, and electrical conductors fashioned to connect to and between an electrical receptacle and a electrical plug.

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Drawings - - Figures

**[0014]** Fig. 1 is a perspective view of the present invention illustrating the intended function of providing this device to connect to a electrical power cord in order to provide illumination onto a electrical receptacle.

**[0015]** Fig. 2 is a perspective view of the present invention.

**[0016]** Fig. 3 is a perspective view of an additional embodiment of the present invention – Illuminated electrical plug adapter for a 220 VAC power cord.

**[0017]** Fig. 4 is an exploded view of the present invention.

**[0018]** Fig. 5 is a perspective view of another embodiment of the present invention.

**[0019]** Fig. 6 is an exploded view of additional embodiment – Adhesive bracket mount.

**[0020]** Fig. 7 is an exploded view of additional embodiment – Wall transformer case mount.

**[0021]** Fig. 8 is an exploded view of the lighting components.

**[0022]** Fig. 9 is a magnified view of the flexible switch cover.

**[0023]** Fig. 10 is a magnified view of the diffusing lens.

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**[0024]** Fig. 11 is an exploded view of the switch and battery holding assembly.

**[0025]** Fig. 12 is an exploded view of the switch and battery assembly modified to allow recharging of the battery.

**[0026]** Fig. 13 is a magnified view of the conductor that connects the battery to a recharging circuit.

**[0027]** Fig. 14 is the inverse side of the circuit board showing the conductors connecting the recharging circuit.

**[0028]** Fig. 15 is an exploded view of another embodiment of the present invention showing the addition of recharging components.

**[0029]** Fig. 16 is a magnified perspective view of the recharging circuitry.

**[0030]** Fig. 17 is a perspective view of another embodiment of the present invention.

**[0031]** Fig. 19 is an electronic diagram of the preferred embodiment of the present invention.

**[0032]** Fig. 20 is an electronic diagram of another embodiment of the present invention modified for recharging of the battery.

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Drawings - - Reference Numerals

100 Light module case	108A Circuit board for spring metal contactor
101 Switch Cover	109, 109A: Recharging conductor
102 Diffusing lens	110, 111: Wire conductor
103 Battery	112 Resistor
104 Switch contact	113 Recharging contact board
105 Battery & switch holding component	113A, 113B: Wire – recharging circuit
105A Battery & switch holding component for recharging embodiment	113C Location of recharging contact board
106 Light emitting diode	115 Wire, fuse link – to recharging assembly
107 Circuit board	115A, 115B: Wire – to recharging assembly
107A Circuit board modified for recharging embodiment	116 Transformer – recharging assembly
108 Spring metal contactor	



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117 Circuit board – recharging assembly	141 Illuminating module bracket
119, 119A, 119B, 119C: Rectifier	142 Adhesive panel
120 Recharging circuit	143 Wall mount transformer case
130 Power conductor - grounding lug	201 Illuminating module of the preferred embodiment
131, 132, 133: Power conductor	201A Illuminating module – recharging embodiment
135 Adapter body –preferred embodiment	201B Illuminating module – wall transformer embodiment
136 Adapter body – recharging embodiment	202 Illuminated electrical plug adapter assembly of the preferred embodiment
137, 137A, 137B: Socket openings	203 Illuminated electrical plug adapter assembly – additional embodiment
138 Opening – battery installation & replacement	204 Illuminated electrical plug adapter assembly – additional embodiment, for 220 volt equipment
139 Conductor	
139A Conductor	
140 Spacer	

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205 Switch & battery holder  
assembly

207 Recharging assembly

205A Switch & battery holder  
assembly – recharging  
embodiment

208 Additional embodiment –  
Illuminated multiple output  
adapter assembly

206 Battery contactor assembly

209 Existing Power Transformer  
assembly

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DETAILED DESCRIPTION - - FIGS 1, 2, 4, 8, 9, 10, 11, 19 - -PREFERED  
EMBODIMENT

**[0033]** For purpose toward promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings. Specific language will be used to describe same. It will, nevertheless, be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications of the illustrated device, and such further applications of the principles of the invention as illustrated herein being contemplated as would normally occur to one skilled in the art to which the invention relates.

**[0034]** Certain terminology is used in the following description for convenience only and is not limiting. The words "right", "left", "upper", "lower", "inside", "outside", and "in front of" designate the placement and location of components from the user's point of view. The word "user" is to mean a person using the illuminated electrical plug adapter. The words "led" and "leds" are used throughout as a shortened term for "light emitting diode" and "light emitting diodes". The word "power cord" is used to describe an electrical cord/plug assembly. The word "power cable" is used to describe an electrical cable without a plug. The terminology includes the words above specifically mentioned, derivatives thereof and words of similar import.

**[0035]** FIGS. 1 & 2 show two views of the Illuminated electrical plug adapter assembly **202**; FIG 1. illustrating use of the device.

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**[0036]** Referring now to FIG. 4 of the drawing, device **202** is shown comprising Illuminating module assembly **201**, removably held frictionally or by other suitable means in place by Adapter body **135** which also holds Power conductors **131**, **132**, and **133**; permanently held in place by any suitable means. Adapter body **135** is made of any suitable non-conductive material.

**[0037]** Referring now to FIG. 8 of the drawing, Illuminating module assembly **201** comprises Illuminating module case **100** and Switch cover **101** (FIG.9) which encloses Switch & battery holder assembly **205** and Battery **103**. Switch cover **101** is molded or attached by any suitable means, or is a part of Illuminating module case **100** in order to provide a flexible seal which allows user to actuate Switch & battery holder assembly **205**. Opening **138** allows installation and replacement of Battery **103**. Diffusing lens **102** (FIG. 10) is made of a suitable transparent material and is molded or attached by any suitable means to Illuminating module case **100**.

**[0038]** FIG. 11 of the drawing shows Switch & battery holder assembly **205**. This assembly comprises Switch contact **104**, Battery & switch holding component **105**, Circuit board **107**, and Light emitting diode **106**. The Battery & switch holding component **105** is made of a non-conductive material and is sandwiched between Circuit board **107** and Switch contact **104**; these components are adhesively combined or held together by any suitable means. This assembly forms Opening **138** (FIG. 8), which holds Battery **103** (FIG. 8) in place within the assembly and maintains electrical contact with Conductor **139**. Spacer section **140** creates a space between Switch contact **104** and Battery **103**. Switch contact **104** is electrically

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conductive and has a flexible characteristic enabling contact with the battery – a predetermined amount of force applied to the contact in a direction towards the battery causes physical and electrical contact with battery **103**. Light emitting diode **106** is electrically connected to Conductor **139** and Switch contact **104**. When Switch contact **104** is electrically connected to Battery **103**, electron flow through Led **106** is started and Led **106** will produce useful illumination.

**[0039]** FIG. 19 shows the electrical diagram of the preferred invention. Adapter body **135** houses Power conductors **131**, **132** & **133**, which allow electron flow from a receptacle, through the assembly and to any plug connected to the Illuminated Electrical Plug adapter. Illuminating module assembly **201** is the switching mechanism for LED **106** – the actual switching component is Switch contact **104**. Switch contact **104** closes the circuit by electrically connecting Battery **103** to Led **106**. Resistor **112**, if needed is an amperage controlling component for LED **106**.

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DETAILED DESCRIPTION - - FIGS 2, 3, 5, 6, 7, 12, 13, 14, 15, 16, 17, 20 --  
-- ADDITIONAL EMBODIMENTS

**[0040]** Referring now to FIG. 5, showing the Illuminated Electrical Plug adapter designed as a grounding adapter. Identical to Illuminated electrical plug adapter assembly **202** (FIG. 2) except for the differently shaped Power conductor **130**, Illuminated electrical plug adapter assembly **203** uses Power conductor **130**, more accurately described as Grounding lug **130** to enable an electrical connection through the cover screw and to the electrical ground of older style wall plate receptacles not having a grounding jack.

**[0041]** Illuminated electrical plug adapter assembly **203** uses Illuminating module assembly **201** (FIG. 5) in order to provide illumination for the user.

**[0042]** Additional embodiments include 220 VAC Illuminated Electrical Plug Adapter assembly **204** (Fig. 3) and Illuminated multiple output electrical plug adapter assembly **208** (FIG. 17).

**[0043]** Figure 6 discloses another embodiment comprising Bracket **141** and Adhesive panel **142**, designed to attach to an existing wall mount transformer **209**. Adhesive panel **142** is adhesive on both sides to attach bracket **141** to Transformer **209**, but any suitable means of affixation may be used. Illuminating module **201B** is held in position by means of friction or any suitable means as is known in the art into bracket **141** in order to provide lighting onto an intended receptacle.

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**[0044]** Figure 7 shows another mounting design for attaching illuminating module **201B** to a wall mount transformer. Wall mount transformer case **143** is designed to hold Illuminating module **201B**.

**[0045]** Other embodiments may include a recharging circuit for Battery **103** (FIG. 12). FIG. 15 shows how Recharging assembly **207** locates within Adapter body **137**. Recharging assembly **207** (FIG. 16) contains the components to allow recharging functions as explained following.

**[0046]** Referring again to FIG 15, the recharging constituent begins with Power conductors **115**, **115A** and **115B**. They function to convey line voltage to Recharging assembly **207**. FIG. 16 shows a magnified perspective view of this assembly. The line voltage is stepped down to a suitable voltage by Transformer **116** and sent to Rectifier **119 - 119C**. The DC voltage from the rectifier provides power to Recharging circuit **120**, which may be any suitable recharging circuit as is known in the art to maintain the charge level of Battery **103** (FIG. 12). Referring to FIG. 15, Conductors **113A** & **113B**, through Recharging contact board **113**, connect the output voltage from Recharging circuit **120** to Illuminating module assembly **201A**. FIG. 14 shows the bottom of Circuit board **107A**. Conductors **109** & **109A** electrically connect Recharging contact board **113** (FIG. 15) to Wires **110** & **111** (FIG. 12) The presence of Recharging contact board **113** eliminates need to hardwire Illuminating module assembly **201A** to the recharging circuit, allowing for simple removal and replacement of the assembly as shown in FIG 15. When Illuminating module assembly **201A** is installed in Adapter body **137**, Recharging contact board **113** physically aligns and electrically connects to Conductors **109** & **109A** (FIG 14.) Wire **111** is a jumper from Conductor **109** to Conductor **139A**, connecting the circuit to

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(refer to Fig. 12) one pole of Battery **103**. Wire **110** electrically connects the recharging voltage to Battery contactor assembly **206**, which closes the recharging circuit. Battery contactor assembly **206** is shown in FIG. 13 and consists of two parts: Circuit board **108A** and Spring metal contactor **108**. This component maintains electrical contact with and allows voltage to flow to Battery **103** (FIG. 12) any time the illuminated electrical plug adapter is connected to an active receptacle.

**[0047]** FIG. 20 is an electrical diagram showing Recharging circuit **120** within Adapter body **136**.



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Operation of preferred embodiment and additional embodiments - - FIGS. 1, 2, 3, 4, 5, 6, 7, 8, 11, 15, 16, 17, 18

**[0048]** As illustrated in FIG 1, the function of Illuminated electrical plug adapter assembly **202** is to illuminate a receptacle so a user can see to align and connect the plug safely & accurately in dark situations. To operate, insert the power cord of the device into the socket openings **137 - 137B** located on the back of Illuminated plug adapter assembly **202** (Fig. 4).

**[0049]** To activate the illumination, a user depresses Switch cover **101** (FIG.8) which activates the circuit, causing illumination from Light emitting diode **106** (FIG. 11). When user releases or again depresses Switch **101**, the illumination will deactivate.

**[0050]** To replace the battery, Illuminating module assembly **201** (FIG.4) is removed from Adapter body **135** to gain access to Battery **103** (FIG. 8). The battery is removed from Opening **138** and a new battery is installed. Illuminating module assembly **201** is then inserted back into Adapter body **135** (FIG. 15).

**[0051]** In regard to operation and battery replacement, all Illuminated electrical plug adapter assemblies (FIG.3, **204** FIG.5, **203**, FIGS. 6 & 7, **201B** & FIG. 17, **208**) operate in the same manner.

**[0052]** The addition of the Recharging assembly **207** (FIG.16) may be present in Illuminated electrical plug adapter assemblies (FIG 2) **202**, (FIG. 3) **204**, (FIG. 5) **203**, (FIG. 7 **201B** and (FIG. 17) **208**.

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**Advantages:**

**[0053]** From the description above, a number of advantages of my Illuminated electrical plug adapter become evident:

**[0054]** (a) Use of the adapter provides a directed light source, clearly illuminating the intended electrical receptacle.

**[0055]** (b) Combines the features of separate devices (electrical adapters and portable lighting) into one device. Combined, these features offer a higher level of safety and convenience. An example of this would be the ability to locate and illuminate a receptacle in a darkened area using just the Illuminated Electrical plug adapter.

**[0056]** (c) By illuminating the receptacle, user can see to accurately align and safely insert the power cord.

**[0057]** (d) The illuminating module uses a low power light emitting diode so the battery will have a long run-time. When the battery needs replacement, User can easily replace the battery.

**[0058]** (e) The Illuminated Electrical Plug adapter can utilize a recharging circuit that will keep the battery recharged, enabling very long battery life. Situations where battery life may be shortened by constant use can benefit from use of this configuration.

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Conclusion, Ramifications, and Scope:

**[0059]** Accordingly, the reader will see that compared to using a standard plug or adapter, my Illuminated electrical plug adapter can provide a user with an unobtrusive and inexpensive means to more safely and easily perform this very common everyday task of plugging a electrical device into a receptacle. Furthermore, my Illuminated Electrical Plug adapter provides additional advantages in that:

**[0060]** (a) The present invention enables user to easily locate receptacles in dark environments;

**[0061]** (b) The present invention is designed to be used with conventional electrical cords thereby allowing use of the adapter on any device having a corresponding electrical plug.

**[0062]** (c) The illuminating module is removable for battery or module replacement.

**[0063]** (d) The present invention and additional embodiments enable user to provide to a variety of electrical plugs an affordable, temporary, and quick conversion from non-illuminated to illuminated.

**[0064]** Although the description above contains many specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments.

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**[0065]** Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.